

## CLAIMS:

1. A low-pressure mercury vapor discharge lamp comprising an at least partly substantially cylindrical discharge vessel with a length  $L_{dv}$  and with an internal diameter  $D_{in}$ ,  
 - the discharge vessel enclosing, in a gastight manner, a discharge space provided with a inert gas mixture and with mercury,

5 - the discharge vessel comprising discharge means for maintaining a discharge in the discharge space,  
 characterized in that the ratio of the weight of mercury  $m_{Hg}$  in the discharge vessel to the product of the internal diameter  $D_{in}$  and the length of the discharge vessel  $L_{dv}$  is given by the relation:

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$$\frac{m_{Hg}}{D_{in} \times L_{dv}} = C,$$

wherein  $C \leq 0.01 \mu\text{g}/\text{mm}^2$ .

2. A low-pressure mercury vapor discharge lamp as claimed in claim 1,  
 characterized in that  $0.0005 \leq C \leq 0.005 \mu\text{g}/\text{mm}^2$ .

15 3. A low-pressure mercury vapor discharge lamp comprising an at least partly substantially cylindrical discharge vessel with a length  $L_{dv}$  and with an internal diameter  $D_{in}$ ,  
 - the discharge vessel enclosing, in a gastight manner, a discharge space provided with a inert gas mixture and with mercury,

20 - the discharge vessel comprising discharge means for maintaining a discharge in the discharge space,  
 characterized in that

- the product of the mercury pressure  $p_{Hg}$  and the internal diameter  $D_{in}$  of the discharge vessel is in a range of  $0.13 \leq p_{Hg} \times D_{in} \leq 8 \text{ Pa.cm}$ .

25 4. A low-pressure mercury vapor discharge lamp as claimed in claim 3,  
 characterized in that the product of the mercury pressure  $p_{Hg}$  and the internal diameter  $D_{in}$  of the discharge vessel is in a range of  $0.13 \leq p_{Hg} \times D_{in} \leq 4 \text{ Pa.cm}$ .

5. A low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized in that the discharge vessel contains less than 0.1 mg mercury.

6. A low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized

- in that the discharge means comprises electrodes arranged in the discharge space,

- in that an electrode shield at least substantially surrounds at least one of the electrodes, and

- in that the electrode shield is made from a ceramic material or from stainless steel.

7. A low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized

- in that the means for maintaining an electric discharge are situated outside a discharge space surrounded by the discharge vessel, and

- in that said means comprise a coil provided with a winding of an electrical conductor, with a high-frequency voltage, for example having a frequency of approximately 3 MHz, being supplied to said coil in operation.

8. A low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized in that the product of the pressure of the inert gas mixture  $p_{\text{igm}}$  and the internal diameter  $D_{\text{in}}$  of the discharge vessel is in a range of  $p_{\text{igm}} \times D_{\text{in}} \geq 5.2 \text{ Pa.m}$ .

9. A low-pressure mercury vapor discharge lamp as claimed in claim 8, characterized in that  $p_{\text{igm}} \times D_{\text{in}} \geq 8 \text{ Pa.m}$ .

10. A low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized

- in that at least a portion of an inner wall of the discharge vessel is provided with a protective layer, and

- in that the protective layer comprises a material selected from the group formed by oxides of scandium, yttrium, and a further rare-earth metal, and/or a material

selected from the group formed by borates of an alkaline-earth metal, scandium, yttrium, and a further rare-earth metal, and/or a material selected from the group formed by phosphates of an alkaline-earth metal, scandium, yttrium, and a further rare-earth metal.

- 5 11. A low-pressure mercury vapor discharge lamp as claimed in claim 10, characterized in that the alkaline-earth metal is calcium, strontium, and/or barium.
12. A low-pressure mercury vapor discharge lamp as claimed in claim 10, characterized in that the further rare-earth metal is lanthanum, cerium, and/or gadolinium.
- 10 13. A low-pressure mercury vapor discharge lamp as claimed in claim 10, characterized in that the oxide is yttrium oxide and/or gadolinium oxide.
14. A low-pressure mercury vapor discharge lamp as claimed in claim 10, characterized in that the discharge vessel is made from a glass comprising silicon dioxide and sodium oxide, with a glass composition comprising the following essential constituents, given in percentages by weight (wt.%): 60-80 wt.%  $\text{SiO}_2$  and 10-20 wt.%  $\text{Na}_2\text{O}$ .
- 15 15. A low-pressure mercury vapor discharge lamp as claimed in claim 14, characterized in that the glass composition includes the following constituents: 70-75 wt.%  $\text{SiO}_2$ , 15-18 wt.%  $\text{Na}_2\text{O}$ , and 0.25-2 wt.%  $\text{K}_2\text{O}$ .
- 20 16. A low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized in that the discharge vessel is made from a glass which is substantially free of  $\text{PbO}$  and which comprises, expressed as a percentage by weight, the following constituents: 55-70 wt.%  $\text{SiO}_2$ , <0.1 wt.%  $\text{Al}_2\text{O}_3$ , 0.5-4 wt.%  $\text{Li}_2\text{O}$ , 0.5-3 wt.%  $\text{Na}_2\text{O}$ , 10-15 wt.%  $\text{K}_2\text{O}$ , 0-3 wt.%  $\text{MgO}$ , 0-4 wt.%  $\text{CaO}$ , 0.5-5 wt.%  $\text{SrO}$ , 7-10 wt.%  $\text{BaO}$ .
- 25 17. A low-pressure mercury vapor discharge lamp as claimed in claim 16, characterized in that the composition of the discharge vessel comprises: 65-70 wt.%  $\text{SiO}_2$ , 1.4-2.2 wt.%  $\text{Li}_2\text{O}$ , 1.5-2.5 wt.%  $\text{Na}_2\text{O}$ , 11-12.3 wt.%  $\text{K}_2\text{O}$ , 1.8-2.6 wt.%  $\text{MgO}$ , 2.5-5 wt.%  $\text{CaO}$ , 2-3.5 wt.%  $\text{SrO}$ , 8-9.5 wt.%  $\text{BaO}$ .
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18. A low-pressure mercury vapor discharge lamp as claimed in claim 16, characterized in that the composition of the discharge vessel in addition comprises: 0.01–0.2 wt.%  $\text{Fe}_2\text{O}_3$  and/or 0.01–0.2 wt.%  $\text{CeO}_2$  and/or 0.01–0.15 wt.%  $\text{SO}_3$ .
- 5 19. A low-pressure mercury vapor discharge lamp as claimed in claim 16, characterized in that the sum of the concentrations of  $\text{Li}_2\text{O}$ ,  $\text{Na}_2\text{O}$ , and  $\text{K}_2\text{O}$  is in a range from 14 to 16 wt.% and/or the sum of the concentrations of  $\text{SrO}$  and  $\text{BaO}$  is in a range from 10 to 12.5 wt.%.  
10 20. A compact fluorescent lamp comprising a low-pressure mercury vapor discharge lamp as claimed in claim 1, 2, 3, or 4, characterized in that a lamp housing is attached to the discharge vessel of the low-pressure mercury vapor discharge lamp, which lamp housing is provided with a lamp cap.